15. On the Annelids of the Family Nereidæ collected by Mr. F. A. Potts in the N.E. Pcific, in 1911.—With a Note on the Morphology of *Micronereis* as a Representative of the Ancestral Type of the Nereidæ.

By L. N. G. Ramsay, M.A., B.Sc., Carnegie Research Scholar, Christ's College, Cambridge *.

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(Text-figures 1–7.)

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The Annelid fauna of the Pacific coast of North America is already fairly well known, and in the present paper only one addition is made to it. This, however, is of great interest, as it is a representative of the little known genus *Micronereis*, and is apparently identical with *M. variegata* of European waters, the solitary species of the genus.

The remaining five species contained in the collection are already well known in this region ; several of these are represented on the opposite shores of the Pacific by very nearly allied species, some criticism of which will be found under their various heads.

The collection also includes two examples of the remarkable and extremely interesting *Nereis cyclurus* Harr., from which some new facts as to the setæ are brought to light.

Nereis cyclurus Harr.

Nereis cyclurus Harrington (4), p. 214, 1897, pls. xvi., xvii., xviii.

N. shishidoi Izuka (5), p. 177, pl. xix. figs. 10–18.

Two examples, Nanoose Bay, June 13th, 1911. Dredged in 6 fathoms, in soft mud. Commensal with hermit-crabs.

In Mr. Potts' notes these are described as of a "pale flesh-

* Communicated by Prof. J. Stanley Gardiner, F.R.S., F.Z.S.

colour, the palps and anterior part of prostomium white, as also a prominent nuchal band. Tentacles and tentacular cirri brownish. In every segment a narrow anterior white band. Posteriorly the notopodia increase in size and become white in colour. Dorsal cirri flesh-coloured."

This remarkable species has been fully described and figured by Harrington and Johnson (**6**, pls. iv., v.). I have here to add only a few further notes on the setæ and some remarks on its affinities.

As to the bristles, both specimens under consideration exhibit an important feature, which has either been overlooked by other writers, or as is perhaps less probable, occurs only in some specimens. This is the occurrence of a curious homogomph falcate type of seta in the notopodial bundle of the posterior parapodia. This form of seta, which is not unlike that which occurs in the notopodium of the posterior parapodia of *N. procera* Ehl., is figured (text-fig. 1). In the larger of the two, which measures

Text-figure 1.

Homogomph falcigerous seta from notopodial bundle of 50th parapodium of *Nereis cyclurus*. × 200.

75 mm. in length, with 107 pairs of parapodia, and has the characters of the peristome and parapods fully developed, these falcate setæ appear at the 32nd parapod. They are at first two in number, increasing to three or four about the 50th to 70th, and decreasing to one or two near the posterior end. The spinigers of the dorsal bundle, numerous anteriorly, decrease steadily in number, until by the 50th there are only two or three and further on none at all.

Anteriorly the lower neuropodial bundle consists entirely of falcigers, but about the same region as in the case of the notopodial falcigers, heterogomph spinigers appear in small numbers, and persist to the posterior end.

In the smaller specimen, which is about 26 mm. long with 59 setigerous segments (it is incomplete, and lacks perhaps 20 segments posteriorly), the peristome is not fully developed. The distribution of the setæ agrees exactly with that given above, the notopodial falcigers commencing about the 29th pair.

The seta-distribution in these two specimens may therefore be summarised thus:—

Region of body ...	Anterior.	Mid.	Posterior.
Notopodial bundle.	Hom. spins. (numerous).	Hom. spins. (few). Hom. falcs. (few).	Hom. spins. (rare). Hom. falcs. (1–2).
Upper neuropodial bundle.	Hom. spins. (numerous). Het. falcs. (few).	Hom. spins. (fewer). Het. falcs.	Hom. spins. Het. falcs.
Lower neuropodial bundle.	Het. falcs. (numerous).	Het. spins. (few). Het. falcs. (fewer).	Het. spins. (few). Het. falcs.

Nereis cyclurus appears to have a considerable range along the western sea-board of North America, from Southern California (Moore, **12**) to Puget Sound.

Izuka has described *N. shishidoi*, a closely allied species, from the eastern side of Japan. The description is based on the solitary specimen which has been obtained there.

It is difficult to imagine what reasons Izuka can have had for separating the Japanese example as a distinct species. His description and figures, which are excellent, agree exactly with *N. cyclurus*. His only comment on the relationship of the Japanese specimen to the American ones is that *N. shishidoi* "comes nearest" to *N. cyclurus*. Harrington's description of the paragnaths of the basal ring (V–VIII) is a little difficult to understand, and this may have led Izuka to separate his specimen. Comparison, however, of the present specimens shows that the paragnaths agree exactly with those of the Japanese worm.

Harrington, after summarising the differences between *N. cyclurus* and *N. fucata* Sav., concluded that these two worms, both normally commensal with hermit-crabs, were closely related.

Moore (**11**, p. 343) suggests the generic separation of *cyclurus* from other nereids on account of the extraordinary peristomium.

To the present writer it seems that these authorities are both right in their way. *cyclurus* is possibly more nearly related to *fucata* than to any other species, as the form of the parapods, setæ, arrangement of paragnaths, etc., would seem to indicate. The enlarged bilobed noto-ligule in *cyclurus*, bearing the noto-cirrus below the upper lobe, is little more than an exaggerated form of the noto-ligule of *fucata*. On the other hand, the development of the peristomium in the full-grown *cyclurus* is so extraordinary that it might be regarded as ample ground for the establishment of a new genus, were it not for the close resemblances in other respects to certain other members of the genus *Nereis*.

Here we have an interesting problem. *N. cyclurus* and *N. fucata* are admittedly closely allied in some respects. The former inhabits the North Pacific, the latter the North Atlantic. It is probable that at a former epoch the distribution of the two was continuous (around the north coast either of Eurasia or of America, or *viâ* Panama). The existence of certain other closely allied and even identical species in the two regions points to this. Further, it seems probable that the hypothetical ancestor-species of the two had already formed its commensalistic habits before the distribution-area was severed (it would be a remarkable coincidence for the two allied species to have taken up the same habit independently—a habit not exhibited by any other nereid). Then, after the separation, the Pacific division of the ancestral species, apparently under the same conditions (both inhabit Gastropod shells tenanted by species of *Eupagurus*, *Pagurus*, etc.), has made an enormous stride in evolution, the while that the Atlantic division has remained more or less stationary!

Nereis vexillosa Grube.

Nereis vexillosa Grube, Ehlers (**2**), p. 573, Taf. xxiii. figs. 3–5.

An example of this fine species, labelled "St. Paul Island, Alaska, 1897," accompanies the collection.

This form, originally described by Grube from the Sea of Okhotsk (**3**, p. 3, Taf. ii. figs. 1, 5, 6), is now known to inhabit also the west coast of America from Alaska to California. Izuka, in 1912 (**5**, p. 173), described a very closely allied species from Japan, *N. ezoensis*. He gives no reason for separating this, except that "the falcate end-piece of bristles [is] much longer in this species than in the closely allied *Nereis vexillosa*." He figures a falcate bristle, but omits to state from what region of the body it is taken. Now, in *N. vexillosa*, as in certain other nereids, the length of the end-piece of the falcate bristles decreases very markedly, proceeding from head to tail. In the specimen before the writer at present, the falcigers from the posterior portion of the body have certainly appendages very much shorter than that figured by Izuka, but in those from the anterior portion (*e. g.*, 10th parapod) they are nearly as elongate as in the figure. I can discern no other difference between the two species from Izuka's description and his excellent figures, and would therefore suggest a more detailed comparison, with a view to determining the specific distinctions in a way more satisfactory to others. Apart from the progressive variation in length of the falcigers throughout the body of a single individual, that in different individuals must be taken into account.

Nereis pelagica L.

Nereis pelagica L., Izuka (**5**), p. 154, pl. xvii. figs. 1–6.

One specimen, dredged near Turn Island, Friday Harbour, Puget Sound, 18th July, 1911.

This specimen is referred to in Mr. Potts' notes as a "blue nereid, among kelp-roots." It is a female heteronereid, of rather small size, measuring about 35 mm. in length, with 54 pairs of parapodia (the body is not quite complete posteriorly). The transition in the form of the parapodia occurs at nos. 16–17.

There is, I think, no doubt that this nereid is of the same species as that figured and described by Izuka (*loc. cit.*) under this name. But while it agrees exactly in other respects with Izuka's description and figures, it exhibits a difference in the paragnaths of the basal division of the proboscis (V–VIII groups). These are so numerous as to form a complete band around the proboscis, consisting chiefly of small, pale brown, rounded (not sharply pointed) paragnaths, covering closely almost the whole surface. Group VI is represented by a well-marked little bunch of large pointed paragnaths, which, if alone, would be almost exactly in accordance with Izuka's figure, but these are surrounded by the small paragnaths just described, which invade area V and also link the dorsal with the ventral areas. VII–VIII are affected in much the same way.

Izuka's figures do indicate that the paragnaths of the basal ring are more numerous than those of European *N. pelagica*, but I suspect that the present example must be a more extreme one, if not even an abnormality.

The proboscis was only partially everted, so that it would be difficult to figure it satisfactorily.

The modified parapodia agree in form exactly with those of the male heteronereid figured by M'Intosh (**8**, pl. lxxi. fig. 7) and with those of other specimens from the British Isles.

NEREIS VIRENS Sars.

Nereis virens Sars, Grube (**3**), p. 6, Taf. i. figs. 2, 4, 5, 6.
N. brandti Malmgren (**9**), p. 183 ; Ehlers (**2**), p. 563.
N. dyamusi Izuka (**5**), p. 160, pl. xviii. figs. 1–12.

This large species was found in numbers in muddy beaches at Departure Bay, Pleasant Beach (Seattle), Barkley Sound, and Friday Harbour (*fide* collector's notes).

Two large examples are in the collection (locality ?).

Nereis virens is well known on the west coast of North America, from California to Alaska, and was recorded from the Sea of Okhotsk by Grube in 1849. The Japanese representative has been named *N. dyamusi* by Izuka (see below).

Malmgren (**9**, p. 183) decided that the specimens from the Sea of Okhotsk represented a distinct species, which he named *N. brandti*. Ehlers (*loc. cit.*) followed him, but noted that the two species were so nearly allied "dass wir nur die Variation einer Grundform haben, welche circumpolar im Nordmeere verbreitet ist."

More recent workers, however, agree in considering the Pacific representative as identical with that of the Atlantic coasts [Johnson (**6**), p. 398 ; Moore (**11**), p. 344], and I follow these.

Moore, in 1909 (**12**, p. 244) "provisionally" bestowed the subspecific name of *plenidentata* on specimens from California, which he found to be characterized by a larger number of segments and more numerous paragnaths. He also suggested that the form from the more northerly parts of the Pacific coast should be separated as *N. virens brandti*, on account of similar differences, which he found to be present in a less marked degree. His final opinion on the matter has not yet appeared.

Izuka (**5**, *loc. cit.*) founds his new species on slight differences in the numbers and arrangement of paragnaths in certain groups, and on the number of teeth in the jaws. I should like here to draw attention to an exceedingly good paper on *Nereis virens* from the Atlantic coast of America (**17**). In this the writer gives particulars of the variation of the paragnaths, which he found to be very wide even in a small number of specimens. I can see no reason for regarding the Japanese species as distinct from that of Western America.

Nereis (Platynereis) agassizi Ehlers.

Nereis agassizi Ehlers (**2**), p. 542, pl. xxiii. fig. 1.

Two small specimens from Departure Bay, 8th May, 1911.

These are both male heteronereids which were found amongst material dredged in the Bay.

The paragnaths have the arrangement typical of the species of the *Platynereis* group, I, II, and V being absent, the other groups represented by pectiniform rows, which are not so continuous as usual, but more broken up. (I have noted this feature occasionally in European specimens of *N. dumerilii*.)

The large homogomph falcigerous setæ of the notopodial bundle are represented by a single large bristle with fused appendage in each parapod, commencing about the 14th pair. These have been figured by various authors (**2**, **5**, **10**).

These two nereids, each of which has about 76 pairs of parapodia, are about 25–27 mm. in length. The heteronereid form is not completely assumed, many of the ordinary setæ not yet having been cast in the posterior region. In the more advanced of the two, the transition in the form of the parapodia occurs at the 19–20th pair. The noto-cirri of the first seven pairs have the characteristic swollen outline.

A considerable cloud hangs over the species of *Platynereis* which are found in the Northern Pacific (as in the case of those in other parts of the world).

We are concerned with the three species (?) :—

N. dumerilii Aud. et Edw.
N. kobiensis McIntosh.
N. agassizi Ehlers.

These species in the Pacific Ocean (*dumerilii*, of course, occurring elsewhere) are all characterized by the presence of

the curious fused falcigers in the notopodial bundle, figured by various authors and mentioned above. The presence of these setæ is the only valid point distinguishing any of these species from *N. dumerilii* of the Atlantic coasts which has hitherto been mentioned by any author. Further, no author has yet given any point of distinction between these three Pacific species which has the least weight whatsoever. For example, Izuka describes and figures them, one after the other, in his fine work on Japanese Polychæta, but gives no means whatsoever of distinguishing the three. They are apparently three absolutely indistinguishable species, and they even inhabit the same localities. Nor does he compare them in any way; in not one of the three fully detailed descriptions does he even mention the names of the other two species. Systematic zoology becomes impossible under these conditions.

It does appear that the *Platynereis* of the North Pacific in the adult form* is characterized by these peculiar fused falcigers (which there can scarcely be a doubt are fully homologous with the corresponding unfused homogomph falcigers occurring in *Platynereis* from all other parts of the Oceans).

If this is a valid specific distinction, then we have the following synonymy of *N. agassizi* Ehlers:—

Nereis kobiensis:	McIntosh (**7**), p. 210, pl. xxxiv. figs. 3–6; pl. xvi A. figs. 2–4.
	Treadwell (**15**), p. 226; (**16**), p. 1161.
	Izuka (**5**), p. 162, pl. xvii. figs. 12–13.
Nereis dumerilii A. et E.:	Izuka (**5**), p. 158, pl. xvii. figs. 7–8.
	Marenzeller (**10**), p. 123, pl. ii. fig. 4.

Moore (**11**, p. 344) has already suggested "that the Japanese specimens referred to *N. dumerilii* by Marenzeller belong to this closely related but perfectly distinct species" (i. e., *N. agassizi*).

There remains, however, considerable doubt as to whether *N. agassizi* should not be regarded as a mere subspecies of *N. dumerilii*, and whether the latter has not a world-wide range in the Southern as well as the Northern Hemisphere. This I propose to discuss at a future date, after a more complete examination of the material from all parts of the world which is at my command.

MICRONEREIS VARIEGATA Claparède.

Micronereis variegata Claparède (**1**), p. 57, Taf. xi. figs. 5–7, 1863.

Four specimens, Departure Bay, May 1911.

* Von Marenzeller (10) figures an unfused homogomph falciger from a young Japanese example of *N. dumerilii*, which differs in no way from the ordinary type, and suggests that the unjointed type of bristle in old specimens is derived from this by fusion of the appendage in its socket.

I have compared these with specimens from the South of England, kindly lent by Major Elwes, and have been unable to find any points of specific difference between them.

Claparède's (*loc. cit.*) and McIntosh's (8, p. 261) descriptions and figures fit the British Columbia specimens as well as the European ones.

These tiny nereids, which range from about 4·5 to 7 mm. in length, were found inhabiting globular masses of mucus on brown *Ulva* dredged in Departure Bay. In one case the mucus contained a mass of eggs as well as the worm. On removal the mucus was again secreted. The general colour of the living animals was green, with transverse brown markings on the dorsum of each segment. The anal cirri were in one case dull crimson (Collector's notes).

One of the specimens exhibits a remarkable peculiarity, namely, the presence of a number of slender simple setæ interspersed among the ordinary compound spinigers. Whether these occur throughout the body I was unable to ascertain, but in the mid-region they are certainly present in several pairs of parapodia.

In the 10th, for example, we have the following:—

Notopodium: 15 spinigers, 17 simple setæ.
Neuropodium: 17 „ 17 „ „

The setæ are arranged in a single vertical series, the simple setæ appearing singly or two together between the compound. The former are from one-fourth to one-third the diameter of the latter, and from about one-third to nearly three-fourths the length; they are apparently perfectly smooth, and taper gradually to a fine point.

I have not found any trace of these in the other three specimens, so that it is not possible to regard their presence as a specific distinction.

It should be noted that the four specimens of *Micronereis* in this collection are of two different types—in this respect, that in two of them the trunk and especially the parapodia are so much swollen that adjacent parapodia are in contact with one another; while the remaining two have a scraggy, thin appearance, with wide intervals between adjacent parapodia. I am unable to account for this difference. The "fat" type is represented in text-fig. 2, while text-fig. 5 is of a parapodium of the other.

Micronereis has hitherto been recorded only from the French coasts, both Mediterranean and Atlantic (*Claparède*, *St. Joseph*), and from the South Coast of England (*Elwes*).

Note on the Morphology of Micronereis, *as a supposed Representative of the Ancestral Type of the Nereidæ.*

In order to gain a satisfactory idea of the relationship of *Micronereis* to the rest of the family Nereidæ, a proper understanding of the external structure of the head and its appendages is, among other things, necessary. As these have not been very clearly or fully described by previous workers, I have taken some trouble to determine their relations in the Puget Sound specimens. Owing to the small size of the animals and the crowded condition of their appendages, this was a matter of some difficulty. Specimens were examined microscopically, both by reflected light and, after clearing, by transmitted light, and serial transverse sections of the anterior region of one were also cut with the microtome. The following description is based on an examination by these methods.

Text-figure 2.

Micronereis variegata, Puget Sound.

Anterior extremity from below, showing peristomial cirri and first five pairs of parapodia. × 45.

The first two setigerous segments bear parapodia consisting of one lobe only (text-fig. 2) corresponding to the neuropodium of the remaining feet. Anterior to these only one region is distinguishable, viz., the cephalic or peristomial region, which bears the two pairs of eyes on its dorsal surface. On each side this region bears also two rounded knobs or humps, anterior and posterior (the posterior being also situated rather higher on the side of the head than the anterior). Each of these four knobs bears two large subulate cirri, one dorsal, the other ventral.

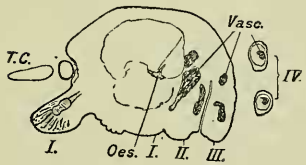
The points of especial significance are:—

(*a*) There is no trace of palps or tentacles.

(*b*) No separate prostomial lobe, as distinct from the peristomium, is developed. The eyes are situated on the dorsal surface of the head in the same transverse plane as the peristomial cirri.

The above views differ from those of Claparède in several particulars. This authority considered that the first pair of parapodia was borne by the buccal segment, and that the first two pairs of parapodia represented the notopodia of the rest. As to the first point, I think it is plain, both in the case of Major Elwes' specimen and in the Puget Sound material, that the first pair of feet arises from the segment next behind that which bears the tentacular cirri. They are, however, directed forward in such a way that it is not unnatural that even a careful observer should conclude that they arose from the buccal segment, if one takes into account the minute size of the worm. The transverse sections make this point still clearer. As to the second point, the sections again show clearly that the first two pairs of feet bear cirri on the under surface—not on the dorsal, as would be the case if they were notopodia. Further, these feet plainly arise from the same level as the neuropodia of the following ones, as can be seen both in the sections and in the complete specimens.

Text-figure 3. Text-figure 4.



Text-figure 3.—*Micronereis variegata.*

Transverse section (oblique) through anterior region, showing one of the posterior pair of tentacular cirri (*T.C.*) and their common base, and the first parapodium (*I.*, on the left); on the right, *I.*, *II.*, *III.*, *IV.* indicate the first four parapodia. *Vasc.*, vascular tissue of same. × 56.

Text-figure 4.—*Micronereis variegata.*

Oblique section through the 2nd parapodium, showing the ventral cirrus. × about 137.

These points have an important bearing on the systematic position of the genus.

Claparède also suggested that the parapodial cirri were more of the nature of ligules ("Züngelchen") than true cirri, on account of their position and form. This view, however, seems to me to be quite unnecessary. The cirri have the position, size, and shape of true cirri, and in their cytological structure they also agree. (I have compared the sections with those of *Leptonereis* from Plymouth, which possesses typical nereid parapodia; the only cytological difference between the ligules and cirri in *Leptonereis* is in the presence of numerous blood-capillaries in the former, and their absence in the latter; otherwise they both consist of epithelial tissue and large glandular cells. The

parapodial cirri of *Micronereis* exhibit the same structure so far as can be seen from the material available, which was not preserved for cytological examination.)

With regard to the four pairs of tentacular cirri, Claparède stated that he was unable to decide whether some of these should not be regarded as tentacles ("Kopf-fühler"). As has been indicated by McIntosh, these should probably all be regarded as cirri corresponding to the four pairs present in other nereids.

We are now in a position to compare *Micronereis* morphologically with other nereids. According to the above revised views as to the head-parts and parapodia, it would seem that we have in *Micronereis* a surviving descendant of the primitive ancestral type from which the successful nereid line of to-day has arisen.

The most characteristic features of this well-marked family are to be found in the peculiar, lobed, biramous parapodia, the well-developed prostomium or cephalic lobe with its palps and tentacles, the four pairs of peristomial cirri, and the armature of the proboscis with conical papillæ. All these features can be directly derived from the *Micronereis*-type. This I shall now endeavour to explain :—

Micronereis *as a True Nereid.*—The right of this genus to be included in the family Nereidæ is upheld by the following characters: the body-region bears on each segment a pair of deeply cleft biramous parapodia, each ramus supported by a

Text-figure 5.

Micronereis variegata. 10th parapodium, × 45.

lance-like aciculum and giving rise to a series of compound homogomph spinigerous setæ of typical nereid form, and bearing a subulate cirrus on its external* surface. The first two pairs of parapodia are incomplete, the dorsal division (notopodium) with its spine and seta-bundle being entirely absent. Thirdly, the head-region bears dorsally two pairs of well-developed eyes situated at the angles of a trapezium, and

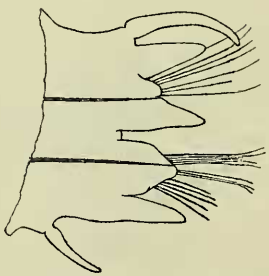
* *I. e.*, respectively dorsal and ventral in the noto- and neuro-podium.

laterally on each side two pairs of large tentacular cirri. Fourthly, the eversible proboscis is provided with a pair of curved toothed jaws.

Micronereis *as a Primitive Nereid.*—The primitive, undifferentiated condition of the genus is indicated by the following points: in the parapodia, the two rami consist of a simple setigerous lobe and cirrus alone, without the development of "lips" and ligules of the more advanced nereids. The occurrence in one of the Puget Sound specimens of simple setæ in addition to the compound spinigers may also be a primitive feature, as may the absence of falcigers. The prostomium and peristomium are fused*, or to put it in another way, *no distinct prostomial lobe has been differentiated from the buccal "segment,"* and, further, palps and tentacles have not begun to be acquired. Thirdly (and this I mention with some doubt, having had no opportunity of examining the everted proboscis), the proboscis is unprovided with papillæ, whether soft or hard.

Advances made by other Nereidæ.—The main ways in which other Nereidæ have progressed are in the differentiation of the parapodia, the arming of the proboscis with papillæ, usually cornified and hard, and the differentiation of a distinct prostomial or cephalic lobe, and the development of two pairs of sensory appendages (palps and tentacles) borne by this lobe.

Text-figure 6.



Parapodium from mid-region of *Nereis kerguelensis*, for comparison. × 20.

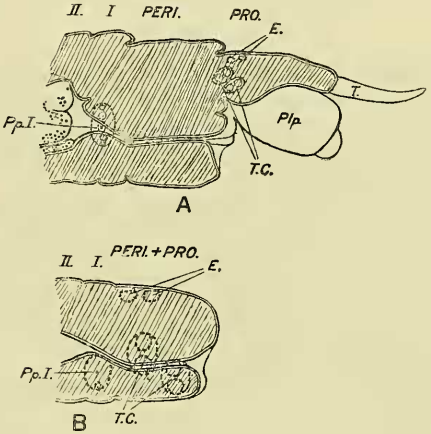
As to the parapodia, the more advanced type is easily to be derived from that of *Micronereis* by the gradual development and elaboration of subsidiary protuberances on the surface of the original simple setigerous ramus. The setigerous lobes of the typical parapodium will thus represent the apices of the original rami of the ancestral type, while the elongate ligules and the smaller "lips" are secondary developments from the sides of

* As Quatrefages has pointed out (14, p. 578).

the same. In *Dendronereis*, this lobation of the rami is carried still further (apart from the dendritic development of the cirri), while in *Ceratocephale* and *Tylorhynchus* the process has probably not gone so far.

Coming to the first two pairs of parapodia, we meet with a difficulty. In these, in the higher forms, the notopodium, although without the setigerous lobe with its spine and bristles, is nevertheless represented by a single ligule and a dorsal cirrus. Well, this is a difficulty, and for the present I shall leave it as such. I hope to elaborate this theory further in a larger work.

Text-figure 7.



A. Sagittal section of anterior region of *Nereis pelagica*, Plymouth. × about 6.

B. *Micronereis variegata*. Sagittal section of anterior region. (Diagrammatic.) × about 50.

PRO., prostomium; *PERI.*, peristomium; *I.*, *II.*, first and second, setigerous segments; *T.*, tentacle; *Plp.*, palp; *E.*, position of eyes; *T.C.*, position of tentacular cirri; *Pp.I.*, position of first parapodium.

The severed surfaces are indicated by shading.

And now we come to the prostomial lobe of the higher forms. This would seem to have been derived from the condition in *Micronereis* by the forward elongation and constricting off of the upper median surface of the head-region, in such a way that the eyes are carried forward so as to be included in the constricted-off lobe. Then on the anterior margin of this lobe palps and tentacles have been developed, in response to the need for more efficient sense-organs consequent on the enlarged activities and "wider outlook on life" which the higher Nereidæ have probably assumed.

Text-fig. 7, A, B, will help to elucidate the foregoing explanation of the homologies of the cephalic region in the two types.

Conclusion.—According to the foregoing reasoning, *Micronereis* should be regarded as a more or less unaltered representative of a primitive ancestral form of the Nereidæ. It does not appear to me that the features of *Micronereis* can be regarded with as much probability as degenerations from the more highly developed type.

I have set forth these views of the facts with some diffidence, owing to my studies having been mainly confined to the single family, the Nereidæ. A wider knowledge of the nereidiform group of the Polychæta might perhaps produce an alteration of them.

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